IN THE CLAIMS:

Please cancel claims 1-19, and add the following new claims:

--20. A plastic structural element, comprising: a plastic material; and at least one insert having a length embedded in the plastic material, such that the insert exhibits the same or different values of at least one of rigidity and thermal expansion coefficients compared to the plastic, the plastic structural element exhibiting at least one of the following features:

a) a plastic coupling layer arranged to join the insert to the plastic material whereby the coupling layer produces one of a gradual and uniform equalization of the E-modulus determining at least one of stiffness and coefficient of thermal expansion between the plastic material and the insert;

b) the insert having an embedded length with at least one opening, at least one of reinforcing fibers, fiber strands and textile type materials being looped through the opening and embedded in and intimately joined to the plastic matrix of the plastic structural element; and

c) the insert having an embedded length with one of strips, fingers and finger-shaped projections that one of lie parallel, are comb-like and fan-shaped, so that there is improved strength and durability between the plastic material and the insert and withstands higher loads.

21. A plastic structural element according to claim 20, wherein the coupling layer contains a reinforced plastic in an epoxy resin matrix.

22. A plastic structural element according to claim 21, wherein the coupling layer contains fiber-reinforced plastic with a fiber content of 30-70 vol. %.

23. A plastic structural element according to claim 22, wherein the fiber-reinforced plastic is a glass reinforced plastic (GRP).

24. A plastic structural element according to claim 23, wherein the glass reinforced plastic contains E-glass fibers.

25. A plastic structural element according to claim 22, wherein the fiber-reinforced plastic is a carbon reinforced plastic (CRP).

26. A plastic structural element according to claim 25, wherein the carbon reinforced plastic contains HT carbon fibers.

27. A plastic structural element according to claim 22, wherein the fiber-reinforced plastic is a mixture of carbon reinforced plastic and glass reinforced plastic.

28. A plastic structural element according to claim 22, wherein the fiber-reinforced plastic has a fiber content of 45-60 vol. %.

29. A plastic structural element according to claim 20, wherein the plastic material contains a reinforced plastic in an epoxy resin matrix.

30. A plastic structural element according to claim 29, wherein the reinforced plastic is a fiber-reinforced plastic with a fiber content of 40-70 vol. %.

31. A plastic structural element according to claim 30, wherein the fiber-reinforced plastic is one of glass reinforced plastic, carbon reinforced plastic and a mixture of glass reinforced plastic and carbon reinforced plastic.

32. A plastic structural element according to claim 31, wherein the fiber-reinforced plastic is a carbon reinforced plastic containing HM carbon.

33. A plastic structural element according to claim 30, wherein the plastic material has a fiber content of 55-65 vol. %.

34. A plastic structural element according to claim 20, wherein the insert contains a metal.

35. A plastic structural element according to claim 34, wherein the metal is one of aluminum, magnesium, an alloy containing aluminum, an alloy containing magnesium, steel and zinc coated iron.

36. A plastic structural element according to claim 20, wherein the insert is made of one of aluminum, magnesium, an alloy containing aluminum and an alloy containing magnesium, the plastic material being reinforced by fibers and having a fiber content of 40 to 70 vol. %, the coupling layer being reinforced by fibers, the coupling layer having a fiber content that is on average 5-15 vol. % lower than the fiber content of the plastic material.

37. A plastic structural element according to claim 36, wherein the plastic material is reinforced by carbon fibers.

38. A plastic structural element according to claim 36, wherein the coupling layer is reinforced by at least one of carbon fibers and glass fibers.

39. A plastic structural element according to claim 38, wherein the coupling layer is reinforced by one of HT carbon fibers and E-type glass fibers.

40. A plastic structural element according to claim 27, wherein at least one of the volume fraction of fibers in the coupling layer decreases toward the insert starting from the plastic material, and the volume fraction of glass fibers increases toward the insert in relation to the amount of carbon fibers.

41. A plastic structural element according to claim 36, wherein at least one of the volume fraction of fibers in the coupling layer decreases toward the insert starting from the plastic material, and the volume fraction of glass fibers increases toward the insert in relation to the amount of carbon fibers.

42. A plastic structural element according to claim 20, wherein the insert is made of one of aluminum, magnesium, an alloy containing aluminum and an alloy containing magnesium, the coupling layer being a layer type composite and having a layered structure of fiber layers, wherein fibers in individual layers of the structure are oriented in at least one direction, at least one of the fibers and the fiber layers lying at the plastic material being aligned with a direction of neighboring fibers and the fiber layers in the plastic material so that a deviation in orientation of the fibers is less than 60°, one of the fibers and fiber layers lying next to the insert having an orientation of - 30° to - 70° or + 30° to + 70°, where 0° represents a direction of main forces acting on the insert.

43. A plastic structural element according to claim 42, wherein the deviation in the orientation of the fibers is less than 45°.

44. A plastic structural element according to claim 42, wherein the fibers are oriented in a direction parallel to a side face of the coupling layer.

45. A plastic structural element according to claim 22, wherein the fibers and the fiber reinforced plastic of the coupling layer are formed as fiber layers whereby a plurality of fiber layers form a fiber layer system, the individual fiber layers or the individual fiber layer systems made up of a sequence of fiber layers containing different types of fibers.

46. A plastic structural element according to claim 44, wherein the fibers are carbon fibers and glass fibers, at least one fiber layer of glass fibers being arranged to lie against the embedded length of the insert.

47. A plastic structural element according to claim 42, wherein the fibers and the fiber reinforced plastic of the coupling layer are formed as fiber layers whereby a plurality of fiber layers form a fiber layer system, the individual fiber layers or the individual fiber layer systems made up of a sequence of fiber layers containing different types of fibers.

48. A plastic structural element according to claim 47, wherein the fibers are carbon fibers and glass fibers, at least one fiber layer of glass fibers being arranged to lie against the embedded length of the insert.

49. A plastic structural element according to claim 20, wherein the insert has a surface, at least the surface of the insert being made of one aluminum and aluminum alloy, portions of the insert surface which receive the coupling layer being chemically treated.

50. A plastic structural element according to claim 49, wherein the portions of the insert surface which receive the coupling layer are one of phosphate treated, chromate treated and anodically oxidized.

51. A plastic structural element according to claim 49, wherein the metallic surfaces of the insert are one of degreased and roughened at the portions receiving the coupling layer.

52. A plastic structural element according to claim 20, wherein the embedded length of the insert has an enlarged surface area.

53. A plastic structural element according to claim 52, wherein the enlarged surface area is formed by one of openings and grid-like structures in the insert.

54. A plastic structural element according to claim 20, wherein the embedded length of the insert has anchor-like elements.

55. A plastic structural element according to claim 54, wherein the anchor-like elements are one of hook-shaped, T-shaped and trapezium-shaped projections.

56. A plastic structural element according to claim 20, wherein the embedded length of the insert is shaped as an anchoring element.

57. A plastic structural element according to claim 56, wherein the anchoring element is formed by one of bends in the embedded length and corrugations.

58. A plastic structural element according to claim 20, wherein the insert has force transferring reinforcing fibers which are laminated into the plastic material so as to anchor the insert in the plastic material whereby the laminated-in reinforcing fibers are joined to the insert by a loop-type connection.

59. A plastic structural element according to claim 58, wherein the reinforcing fibers are aramide fibers.

60 A plastic structural element according to claim 20, wherein the insert has end parts that are tapered with a ratio of x:y of 1:30 to 1:10, wherein the ratio x:y represents a tangent of an acute angle which is formed by a line running parallel to a central axis and a line joining both end points of the tapering.

61. A process for manufacturing a plastic structural element comprised of a plastic material and at least one insert having a length embedded in the plastic material so that the insert exhibits the same or different values of at least one of rigidity and thermal expansion co-efficients compared to the plastic, the process comprising the steps of:

providing an insert with a coupling layer of fiber-reinforced plastic;

subjecting a region of the insert that comes into contact with the coupling layer to a surface treatment which improves bonding;

introducing the insert with a length to project out of the plastic structural element in a cavity of a mold or a pressing tool; and

shaping the plastic material by one of casting and pressing so that the embedded length of the insert bearing the coupling layer is laminated into the plastic material so as to form a connection by virtue of shape.

62. A process for manufacturing a plastic structural element according to claim 61, wherein the coupling layer is a fiber-type composite and is mounted on a length of the insert, including producing the fiber-type composite by one of injection molding, a sheet-transfer-molding compound process, a resin-transfer-molding process, and a reinforced reaction injection molding process.

63. A process for manufacturing a plastic structural element according to claim 61, wherein the coupling layer is a fiber-layer-type composite, the process including mounting the coupling layer along a length of the insert by one of a resin-transfer-molding process and manual lamination.

64. A process for manufacturing a plastic structural element according to claim 61, including producing the plastic structural element in one of an injection molding process, a